WHAT IS CLAIMED IS:

1.   A coding device for encoding image data, comprising:

transforming means for performing discrete wavelet
transformation on inputted image data, thereby generating
transformation factors of a plurality of frequency sub-
bands;

coding means for entropy-coding each of said sub-
bands; and

generating means for monitoring the amount of a
predetermined sub-band in said each sub-band, and if the
predetermined sub-band exceeds a predetermined code length,
removing coded data included in an area where the sub-band
exceeds the predetermined code length, and if the
predetermined sub-band does not reach said predetermined
code length, adding dummy data to the coded data of said
sub-band, thereby generating fixed length coded data of
said predetermined code length.

2.   The coding device according to claim 1, further
comprising:

inputting means for inputting image data with voice;
and

separating means for separating image data and voice
information from the image data with voice inputted by said
inputting means;

wherein the image data obtained by separation by said
separating means is defined as an object to be transformed

by said transforming means, and for the voice information obtained by separation, coding with little information loss is performed.

3. The coding device according to claim 1, wherein for the sub-band to be subjected to removal, bit planes are removed in ascending order with the lowest bit plane of bit planes expressing the sub-band being first.

4. The coding device according to claim 1, wherein said generating means further comprises means for defining the lowest frequency sub-band of sub-bands obtained by said transforming means as said predetermined sub-band, and making its coded data to be fixed length data.

5. The coding device according to claim 1, wherein said generating means further comprises means for defining each of sub-bands obtained by said transforming means as a predetermined sub-band, and defining the coded data of each sub-band as fixed length data.

6. The coding device according to claim 1, wherein said generating means further comprises means for defining a resolution level constituted by a certain number of sub-bands of the sub-bands obtained by said transforming means as a unit, and defining coded data of such unit as fixed length data.

7. The coding device according to claim 1, wherein said generating means generates a header when generating said fixed length coded data, and information about said fixed length coded data is written in this header.

8.   The coding device according to claim 1, wherein said transforming means comprises storing means for storing therein said transformation factor on a temporary basis, and quantization is performed in the order of from a lower

5   level sub-band to a higher level sub-band from this storing means.

9.   The coding device according to claim 8, wherein said transforming means gives a larger quantizing step to a higher sub-band at the time of said quantization.

10   10.   A coding method of encoding image data, comprising:

a transforming step of performing discrete wavelet transformation on inputted image data, thereby generating transformation factors of a plurality of frequency sub-bands;

15   coding step of entropy-coding each of said sub-bands; and

a generating step of monitoring the amount of a predetermined sub-band in said each sub-band, and if the predetermined sub-band exceeds a predetermined code length,

20   removing coded data included in an area where the sub-band exceeds the predetermined code length, and if the predetermined sub-band does not reach said predetermined code length, adding dummy data to the coded data of said sub-band, thereby generating fixed length coded data of

25   said predetermined code length.

11.   The coding method according to claim 10, further comprising:

an inputting step of inputting image data with voice; and

a separating step of separating image data and voice information from the image data with voice inputted in said

5 inputting step;

wherein the image data obtained by separation in said separating step is defined as an object to be transformed in said transforming step, and for the voice information obtained by separation, coding with little information loss

10 is performed.

12. A storage medium storing therein program codes functioning as a coding device for encoding image data, comprising:

a program code of a transforming step of performing

15 discrete wavelet transformation on inputted image data, thereby generating transformation factors of a plurality of frequency sub-bands;

a program code of a coding step of entropy-coding each of said sub-bands; and

20 a program code of a generating step of monitoring the amount of a predetermined sub-band in said each sub-band, and if the predetermined sub-band exceeds a predetermined code length, removing coded data included in an area where the sub-band exceeds the predetermined code length, and if

25 the predetermined sub-band does not reach said predetermined code length, adding dummy data to the coded

data of said sub-band, thereby generating fixed length

coded data of said predetermined code length.

13. The storage medium according to claim 12, further

comprising:

5   a program code of an inputting step of inputting image

data with voice; and

a program code of a separating step of separating image

data and voice information from the image data with voice

inputted in said inputting step;

10   wherein the image data obtained by separation in said

separating step is defined as an object to be transformed

in said transforming step, and for the voice information

obtained by separation, coding with little information loss

is performed.

15 14. A coding method of encoding image data of each frame

constituting an motion image, comprising:

a transforming step of performing discrete wavelet

transformation on inputted image data, thereby generating

transformation factors of a plurality of frequency sub-

20 bands;

a coding step of entropy-coding each of said sub-bands;

and

a generating step of monitoring the amount of a

predetermined sub-band in said each sub-band, and if the

25 predetermined sub-band exceeds a predetermined code length,

removing coded data included in an area where the sub-band

exceeds the predetermined code length, and if the

predetermined sub-band does not reach said predetermined code length, adding dummy data to the coded data of said sub-band, thereby generating fixed length coded data of said predetermined code length.

5   15. The coding method according to claim 14, wherein the predetermined sub-band of which said coded data is length-fixed is the lowest frequency sub-band.

16. The coding method according to claim 14, wherein the predetermined sub-bands of which said coded data are

10   length-fixed are the lowest frequency sub-band and higher frequency sub-bands subsequent thereto.

17. A coding device for encoding image data of each frame constituting an motion image, comprising:

transforming means for performing discrete wavelet

15   transformation on inputted image data, thereby generating transformation factors of a plurality of frequency sub-bands;

coding means for entropy-coding each of said sub-bands; and

20   generating means for monitoring the amount of a predetermined sub-band in said each sub-band, and if the predetermined sub-band exceeds a predetermined code length, removing coded data included in an area where the sub-band exceeds the predetermined code length, and if the

25   predetermined sub-band does not reach said predetermined code length, adding dummy data to the coded data of said

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sub-band, thereby generating fixed length coded data of said predetermined code length.

18. A storage medium storing therein program codes functioning as a coding device for encoding image data of each frame constituting an motion image, comprising:

a program code of a transforming step of performing discrete wavelet transformation on inputted image data, thereby generating transformation factors of a plurality of frequency sub-bands;

a program code of a code transforming step of entropy-coding each of said sub-bands; and

a program code of a generating step of monitoring the amount of a predetermined sub-band in said each sub-band, and if the predetermined sub-band exceeds a predetermined code length, removing coded data included in an area where the sub-band exceeds the predetermined code length, and if the predetermined sub-band does not reach said predetermined code length, adding dummy data to the coded data of said sub-band, thereby generating fixed length coded data of said predetermined code length.

19. An image playing-back method of decoding/playing-back according to 1 to n-fold playback speeds each frame image coded data obtained by dividing image data of each frame constituting an motion image into frequency sub-bands and encoding the same so that the coded data of predetermined sub-bands of the frequency sub-bands are length-fixed,

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wherein at least one of said length-fixed coded data are decoded as objects to be decoded, and are played back as images of frames to be decoded, in accordance with said playback speed.

5   20. The playing-back method according to claim 19, wherein the predetermined sub-band of which said coded data is length-fixed is the lowest frequency sub-band, and the coded data of said lowest frequency sub-band is decoded as an object to be decoded in accordance with said playback 10   speeds, and is played back as an image of a frame to be decoded.

21. The playing-back method according to claim 19, wherein the predetermined sub-bands of which said coded data are length-fixed are the lowest frequency sub-band and higher 15   frequency sub-bands subsequent thereto, and the coded data of the lowest frequency component, or some coded data of the lowest frequency component and higher frequency sub-bands subsequent thereto are decoded as objects to be decoded in accordance with said playback speeds, and are 20   played back as images of frames to be decoded.

22. An image playing-back device for decoding/playing-back according to 1 to n-fold playback speeds each frame image coded data obtained by dividing image data of each frame constituting an motion image into frequency sub-bands 25   and encoding the same so that the coded data of predetermined sub-bands of the frequency sub-bands are length-fixed, comprising:

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playing-back means for decoding at least one of said length-fixed coded data and playing back the same as images of frames to be decoded, in accordance with said playback speed.

5   23. A storage medium storing therein program codes functioning as an image playing-back device for decoding/playing-back according to 1 to n-fold playback speeds each frame image coded data obtained by dividing image data of each frame constituting an motion image into

10   frequency sub-bands and encoding the same so that the coded data of predetermined sub-bands of the frequency sub-bands are length-fixed, comprising:

a program code of a generating step of decoding at least one of said length-fixed coded data and playing back the

15   same as images of frames to be decoded, in accordance with said playback speed.

24. A coding method of encoding image data of each frame constituting an motion image, comprising:

a transforming step of performing discrete wavelet

20   transformation on inputted image data, thereby generating transformation factors of a plurality of frequency sub-bands;

a dividing step of dividing into code blocks a plurality of frequency sub-bands obtained in said

25   transforming step;

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a decomposing step of forming into bit planes the code

blocks obtained in said dividing step, and decomposing each

bit plane into three coding passes;

a coding step of encoding said each coding pass, and

5 distributing the obtained coded data to a plurality of

layers, thereby generating coded data having a layer

structure; and

a code length controlling step of controlling the coded

data of a predetermined layer in said each layer so that

10 it takes on a predetermined code length.

25. The coding method according to claim 23, wherein the

predetermined layer of which said coded data is length-

fixed is a layer including coding passes for constructing

the uppermost bit plane obtained in said decomposing step.

15 26. The coding method according to claim 23, wherein the

predetermined layer of which said coded data is length-

fixed is each of a plurality of layers.

27. A coding device for encoding image data of each frame

constituting an motion image, comprising:

20 transforming means for performing discrete wavelet

transformation on inputted image data, thereby generating

transformation factors of a plurality of frequency sub-

bands;

dividing means for dividing into code blocks a

25 plurality of frequency sub-bands obtained in said

transforming step;

decomposing means for forming into bit planes the code

blocks obtained in said dividing step, and decomposing each

bit plane into three coding passes;

coding means for encoding said each coding pass, and

5   distributing the obtained coded data to a plurality of

layers, thereby generating coded data having a layer

structure; and

code length controlling for controlling the coded data

of a predetermined layer in said each layer so that it takes

10   on a predetermined code length.

28. A storage medium storing therein program codes

functioning as a coding device for encoding image data of

each frame constituting an motion image, comprising:

a program code of a transforming step of performing

15   discrete wavelet transformation on inputted image data,

thereby generating transformation factors of a plurality

of frequency sub-bands;

a program code of a dividing step of dividing into code

blocks a plurality of frequency sub-bands obtained in said

20   transforming step;

a program code of a decomposing step of forming into

bit planes the code blocks obtained in said dividing step,

and decomposing each bit plane into three coding passes;

a program code of a coding step of encoding said each

25   coding pass, and distributing the obtained coded data to

a plurality of layers, thereby generating coded data having

a layer structure; and

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a program cod of a code length controlling step of controlling the coded data of a predetermined layer in said each layer so that it takes on a predetermined code length.

29. An image playing-back method of forming into bit planes

5 transformation factors obtained by subjecting image data of each frame constituting an motion image to wavelet transformation, decomposing each bit plane into three coding passes, distributing coded data expressing these coding passes to a plurality of layers, and

10 decoding/playing-back each frame image coded data subjected to length fixation according to 1 to n-fold playback speeds for the coded data of predetermined layers,

wherein at least one of said length-fixed coded data are decoded as objects to be decoded, and are played back

15 as images of frames to be decoded, in accordance with said playback speed.

30. The coding method according to claim 27, wherein the predetermined layer of which said coded data is length-fixed is a layer including coding passes for constructing

20 the uppermost bit plane in said each bit plane.

31. The coding method according to claim 27, wherein the predetermined layer of which said coded data is length-fixed is each of a plurality of layers.

32. An image playing-back device for forming into bit

25 planes transformation factors obtained by subjecting image data of each frame constituting an motion image to wavelet transformation, decomposing each bit plane into three

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coding passes, distributing coded data expressing these
coding passes to a plurality of layers, and
decoding/playing-back each frame image coded data
subjected to length fixation according to 1 to n-fold
5   playback speeds for the coded data of predetermined layers,
comprising:

     means for decoding at least one of said length-fixed
coded data and playing back the same as images of frames
to be decoded, in accordance with said playback speed.

10   33. A storage medium storing therein program codes
functioning as an image playing-back device for forming
into bit planes transformation factors obtained by
subjecting image data of each frame constituting an motion
image to wavelet transformation, decomposing each bit plane
15   into three coding passes, distributing coded data
expressing these coding passes to a plurality of layers,
and decoding/playing-back each frame image coded data
subjected to length fixation according to 1 to n-fold
playback speeds for the coded data of predetermined layers,
20   comprising:

     a program code of a step of decoding at least one of
said length-fixed coded data and playing back the same as
images of frames to be decoded, in accordance with said
playback speed.